EPA-USGS Collaboration for Hydrologic Condition Criteria

June 23, 2011

Review

- **Purpose:** Assist States and Tribes with hydrologic water quality criteria development to protect aquatic life designated uses
- **Product:** flexible, non-prescriptive, and concise informational document that includes case studies and considerations for quantification
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Schedule Review

- Introductory webinar (March 17)
  - Status: complete
- Part I: Problem formulation (April 25)
  - Status: Components in progress w/smaller sub-groups
- Part II: Narrative criteria- (June 23)
  - 1 mtg- teleconference/webinar on narrative language options
  - Interim product: Review and revision of strawman outline and language
- Part III: Quantification approaches an application considerations (July-Sept.)
  - 2 mtgs w/final mtg. face to face (as able)
  - Interim products: Chapter 4
- Final draft product (Oct.-Dec.)
  - Compilation, review, and comment incorporation

Narrative Criteria

Chapter 3

Objective

- Today: Review narrative criteria and discuss the outline and language for chapter 3 “Narrative Criteria”, identify gaps, and revise/reorganize.
  - This chapter of the document will describe:
    - the purpose of narrative criteria,
    - key components of narrative hydrologic condition criteria,
    - examples,
    - Implementation in other programs and,
    - necessary policy and legal considerations.

Water Quality Standards Review

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The Clean Water Act (CWA)

- Objective: “restore and maintain the chemical, physical and biological integrity of the Nation’s waters”
- Interim goal: “water quality which provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water”, wherever attainable

Water Quality Standards

- WQS are designed to:
  - Protect public health or welfare
  - Enhance the quality of the water
  - Serve the purposes of the Clean Water Act

- WQS consist of the following components:
  - Designated uses
  - Criteria to protect those uses
  - Antidegradation policy
  - Other general policies

Background

Water Quality Standards consist of:

DESIGNATED USES: management objectives for surface waters, e.g., protection and propagation of aquatic life and recreation in and on the water

CRITERIA: numeric values and/or narrative statements that represent a level of water quality that supports the designated uses

ANTIDEGRADATION POLICY AND PROCEDURES: to maintain and protect existing water quality

WQS: Take Home Messages

- State/Tribal Water Quality Standards:
  - Establish water quality goals and targets for a waterbody
  - Are used to determine attainment and non-attainment
  - Provide the regulatory basis for controls beyond technology-based limits
  - Consist of designated uses, criteria to protect those uses, antidegradation policies, and other general policies
- States, territories, authorized tribes, and EPA have important and unique roles in developing, adopting, reviewing and approving water quality standards.

Designated Uses: What are they?

Regulatory:

- Those uses specified in state or tribal water quality standards regulations for each water body or segment whether or not they are being attained

Plain language:

- A concise statement of management objectives and expectations for each of the individual surface waters under state/tribal jurisdiction

Designated Uses: Examples

- Aquatic life
- Recreation
- Public water supply
- Agricultural
- Industrial
- Navigation
- Ceremonial Uses
- Shellfish Harvesting Areas
- Wildlife Protection
- Endangered Species Protection
- Hydroelectric Power

Existing Uses: What are they?

- Existing uses are those uses actually attained in a waterbody on or after November 28, 1975, whether or not they are included in the water quality standards

- Existing uses serve as a baseline or “floor” of water quality, below which we don’t want to drop

Water Quality Criteria

A numeric or narrative statement that represents a level of a pollutant under which a particular designated use will be supported

- Intended to protect aquatic plant and animal assemblages from adverse impacts due to exposure to a pollutant.

Water Quality Criteria Requirements

- States/Tribes must adopt criteria that protect the designated use
  - Based on a sound, scientific rationale
  - Sufficient parameters to protect the designated use
  - Must support the most sensitive use (for waters with multiple use designations)

Water Quality Criteria: Types

- Aquatic Life Criteria
- Human Health Criteria

Criteria also exist for specific issues:

- Microbial (primary contact)
- Biological Assemblage [biocriteria]
- Nutrients
- Non-priority pollutants
- Organoleptics (taste, smell, appearance)

Aquatic Life Criteria: Components

- Magnitude (how much)
  - Concentration derived based on published toxicity testing values
- Duration (how long can the exceedence be)
  - For acute, generally 1-hour averaging period
  - For chronic, 4-day averaging period.
- Frequency (how often can it exceed)
  - Once every 3 years, for both acute and chronic criteria

Examples of Existing State Narrative Criteria and Related ISF Language

Overview

- 12 states have explicit reference to flow
  - NH, RI, VT, NY, VA, WV, KY, TN, LA, MO, and OR with CA Regions 5 and 8 SWRCB having various mentions in their "Objectives" within Regional Plans.
- 7 tribes have explicit references to flow (see handout)
- No territories have explicit references
- Many states and tribes mention flow in other measures, especially in:
  - Antidegradation policy and
  - Implementation policy- mostly to protect ONRW (outside of formal criteria in WQS) and in
  - Justification for changing uses if natural conditions are not sufficient (Use Attainability Analysis)

Narrative Language Examples

- Narrative language
  - "Protection of designated uses" is most often used (5/11 states, 1/8 tribes)
  - the general protection or conservation of aquatic life, habitat, ecosystem, or similar reference also common.
- **Question: How does the language of a narrative criterion influence how it is quantitatively translated and implemented?**

Narrative Language Examples

- **LA:"**The natural flow of state waters shall not be altered to such an extent that the basic character and water quality of the ecosystem are adversely affected"
- **MO:** "Waters shall be free from physical, chemical, or hydrologic changes that would impair the natural biological community."
- **Pueblo of Santa Clara:** "Natural hydrological conditions necessary to support the biological and physical characteristics naturally present in wetlands "
- For all States, see handout "Final_Table_StateswFlow2011.doc"

EPA Region 1 Examples

Ralph Abele, EPA

Example State WQS which include explicit reference to water quantity

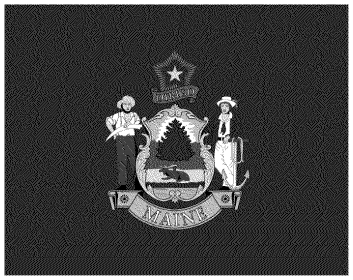
- **Rhode Island** WQS (1998)
  - "For activities that will likely cause or contribute to flow alterations, streamflow conditions must be adequate to protect existing and designated uses"

- **New Hampshire** WQS (1999)
  - "water quantity shall be maintained at levels adequate to meet existing and designated uses"

- **Vermont** WQS Hydrology Criteria (2000)

Vermont Water Quality Standards Hydrology Criteria (2000)

1. Stream Flow Protection
    - **Class A(1):** No more than 5% of 7Q10 change from natural flow regime, in aggregate.
    - **Class B WMT 1**: Changes from natural flow regime no more than minimal amount, uses fully supported
    - **Class A(2)** and other **Class B** : Any change from natural flow regime must support uses and comply with criteria. Site specific study preferred
2. Flow Study Requirements/ site-specific
3. Water level fluctuations
4. High Flow Regime



Maine LD 1488, Water Use Standards (2001)

- Establish water use standards for maintaining in-stream flows & lake or pond levels
- Standards must be based on the *natural variation of flows and water levels.*

Maine DEP WQS Classes and Criteria

	Numeric Criteria		Narrative Criteria	
	Dissolved Oxygen	Bacteria (*E. coli*)	Habitat	Aquatic Life (Biological)
Class AA	as naturally occurs	as naturally occurs	free flowing and natural	as naturally occurs
Class A	7 ppm; or 75% sat.	as naturally occurs	natural	as naturally occurs
Class B	7 ppm; or 75% sat.	64-GM 236/100 ml (instan-taneous)	unimpaired	support all aquatic species indigenous to the receiving water; no detrimental changes to the resident biological community
Class C	5 ppm; or 60% sat.; 30-day avg. 6.5 ppm	126-GM 236/100 ml (instan-taneous)	habitat for fish and other aquatic life	maintain the structure and function of the resident biological community

Non-attainment (NA) stream does not meet minimum criteria

Tom Danielson, Maine DEP

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State and Tribal Activities: Region 4

- Tennessee DEC
  General WQ Criteria
  Chapter 1200-4-3
  - (3) Fish and Aquatic Life
    - (o) Flow – Stream or other waterbody flows shall support the fish and aquatic life criteria.
  - (4) Recreation
    - (m) Flow – Stream flows shall support recreational

State and Tribal Activities: Region 4

- Tennessee DEC con't
  - DeMinimis – an off-ramp from Antidegradation. 5% of 7Q10 or 10% cumulative removal.
  - Water withdrawals will be considered de minimis if less than 5% of the 7Q10 flow of the stream is removed
  - If more than one activity is authorized in a segment and the total of the impacts uses no more than 10% of the assimilative capacity, available capacity, available habitat, or 7Q10 low flow, they are presumed to be de minimus.

State and Tribal Activities: Region 4

- NC Example "Implicit" WQS for Flow:
  - "Biological integrity = the ability of an aquatic ecosystem to support and maintain a balanced and indigenous community of organisms, having species composition, diversity, population densities and functional organization similar to that of reference conditions"
  - Could be used to support natural timing and delivery of flow to support biological integrity
  - NGOs are using it to challenge Section 401 Certifications

Outline for the Narrative Criteria Chapter

3.1 Narrative Criteria: Summarize components of narrative criteria and available language options. Discuss legal/policy issues

3.2 What are WQS?

3.2.1 Designated uses (and existing uses that cannot be removed):

3.2.1.1 Examples: aquatic life, primary contact recreation, public water supply, agriculture, industrial, navigation, ceremonial, shellfish harvesting areas, wildlife protection, drinking water source protection, and hydroelectric. Here, the focus is aquatic life protection.

3.2.1.2 DU's need to be protected, regardless of if a criterion exists or not.

3.2.2 Antidegradation policy,

3.2.3 Criteria

Outline for the Narrative Criteria Chapter

- 3.2 What are narrative criteria (v. numeric), and why do states and tribes use them?
  - 3.2.1 Broad application (v. site specific)
  - 3.2.2 Flexible- can be tailored to management goals in quantitative translation
- 3.3 How are narrative criteria expressed in state and tribal WQS?
  - 3.3.1 Applicability options
    - 3.3.1.1 General, applying to all surface waters
    - 3.3.1.2 Specific to a particular designated use or site (or activity, e.g., Region 1)

Outline for the Narrative Criteria Chapter

- 3.4 How do states and tribes use narrative criteria to protect hydrologic condition both within and outside of the WQS/CWA framework?
  - 3.4.1 State and tribe examples (w/in and out WQS)
  - 3.4.2 Advantages of developing criteria for hydrologic condition
    - 3.4.2.1 Designated use protection is the goal of criteria
    - 3.4.2.2 Implementable in other CWA programs (e.g., TMDL and NPDES permits)
- 3.5 What are components of narrative criteria for protecting hydrologic condition?
  - 3.5.1 Various endpoints/Object of protection (e.g., aquatic life designated uses, biological integrity)
    - 3.5.1.1 Example language
      - 3.5.1.1.1 Pros/Cons

Outline for the Narrative Criteria Chapter

- 3.6 How are narrative criteria implemented in other CWA programs?
  - 3.6.1 Translation into management of objectives and targets of other CWA programs (assessment, listing, anti-degradation, 401 certifications, TMDLs and NPDES permits)
  - 3.6.2 Translation on a case-by-case basis- example
  - 3.6.3 Specific translation procedures in guidance
    - 3.6.3.1 Within WQS- example
    - 3.6.3.2 Outside WQS (instream flow program)- example
  - 3.6.4 Activities to protect hydrologic condition- meeting criteria

Outline for the Narrative Criteria Chapter

3.7 Legal and Policy Considerations

3.7.1 101(g) clarification

3.7.1.1 Protecting designated uses, not allocating water rights

3.7.2 Precedent

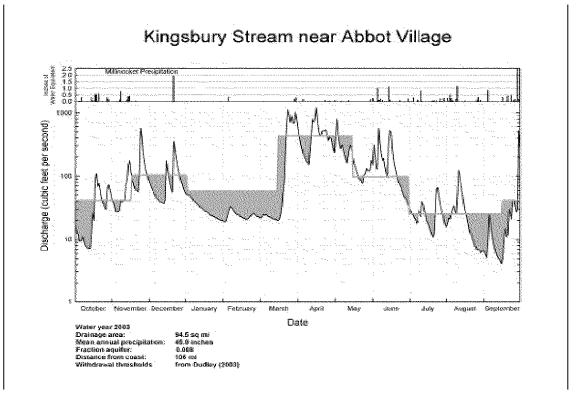
3.7.2.1 Caselaw: Jefferson Co. PUD: quantity v. WQ distinction is artificial

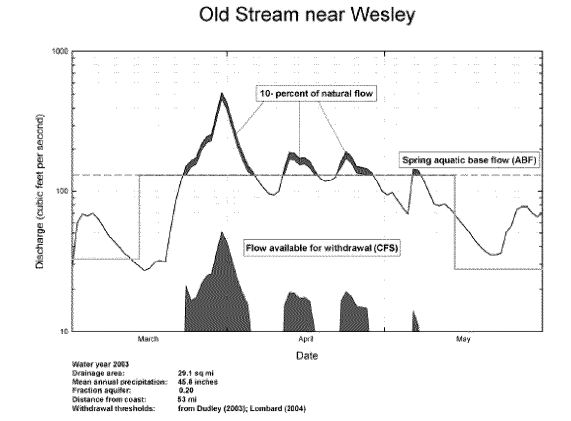
3.7.2.2 States and tribes already adopted narrative criteria for hydrologic condition

Supplementary Slides

Implementation Examples
New England

Maine DEP definition of "Seasonal Aquatic Base Flow"





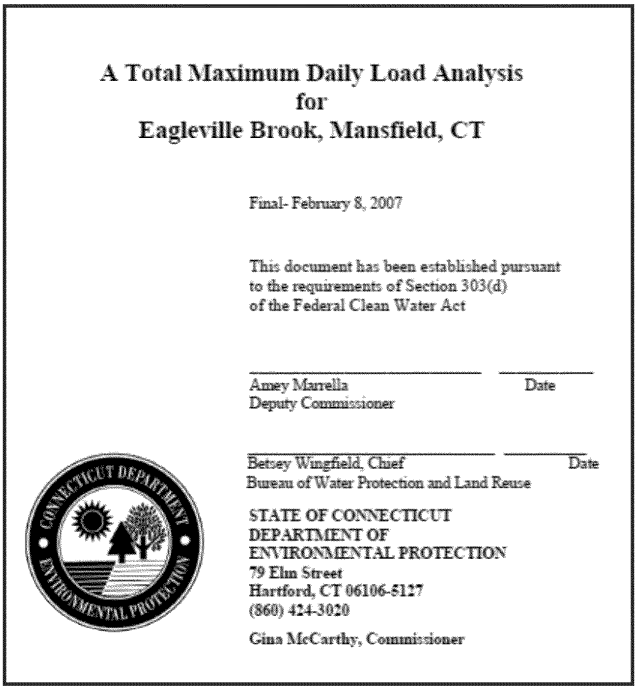
- Seasonal ABF is a median flow value for following six seasons:
  - Winter (Jan.1 to March 15, use Feb. median flow)
  - Spring (March 16 to May 15, use April median flow)
  - Early Summer (May 16 to June 30, use June median flow)
  - Summer (July 1 to Sept. 15, use August median flow)
  - Fall (Sept. 16 to Nov. 15, use October median flow)
  - Early Winter (Nov. 16 – Dec 31, use December median flow.)

Allowable alterations from narrative standards

- Class AA waters
  - When natural flow > spring or early winter ABF, maintain 90% of natural flow
  - When natural flow in any other season > 1.1 times season ABF, maintain 90% of natural flow
- Class A waters
  - May not be maintained at or below seasonal ABF for more than two consecutive seasons
- Class B and C
  - May not be less than seasonal ABF

Sustainable Flow and Aquatic Life Hydrologic Impacts Considerations

- Stormwater TMDLs



A Total Maximum Daily Load Analysis
for
Eagleville Brook, Mansfield, CT

Final- February 8, 2007

This document has been established pursuant
to the requirements of Section 303(d)
of the Federal Clean Water Act

Amey Marrella
Deputy Commissioner — Date

Betsey Wingfield, Chief
Bureau of Water Protection and Land Reuse — Date

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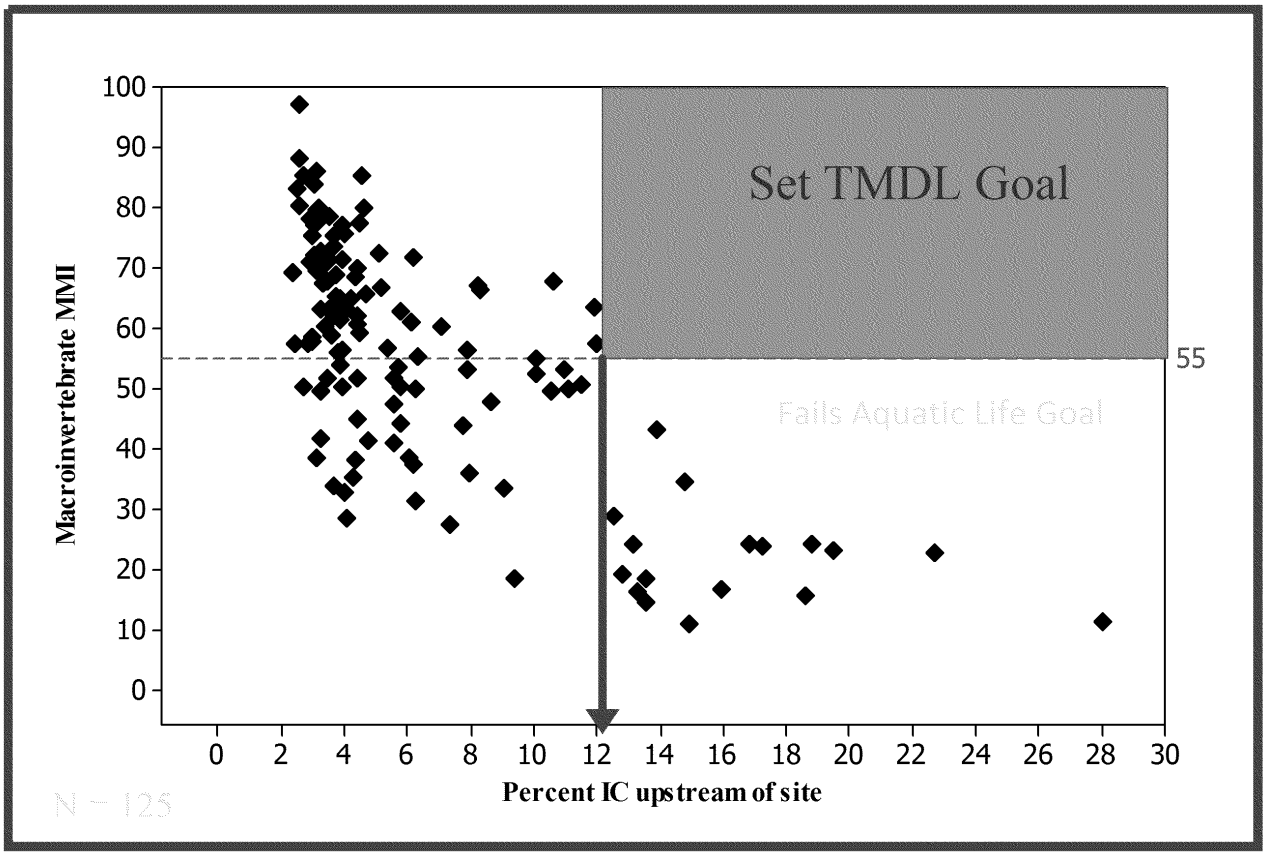
Pollutant Surrogate - Reference Stream TMDLs (Potash Brook, VT)

- Compares flow duration curves of impaired stream to reference streams
- VT uses the Q0.3% high flow value of both curves (approx. 1 year storm) to calculate flow reduction target as a daily percent
- Although not used as an approved TMDL target VT also uses Q95% as a low or base flow increase goal
- Implementation will occur through watershed permits that will specify BMPs to achieve SW runoff flow reduction targets largely through infiltration

Pollutant Surrogate - Impervious Cover TMDLs
(ME and CT)

- Compares IC% in impaired watershed to IC% in unimpaired reference watersheds
- ME uses IC% WLA targets of Class B 6 – 9% and Class C 8 – 13% (riparian buffer, soils, flood plain, cold water input, DO and BPJ inform target selection)
- CT uses IC% WLA target of 11% for all waters in the state (based on monitoring 125 sites in CT)
- Implementation Plan encourages disconnection of IC or mitigation of impact of IC for both future and existing development (Green Infrastructure BMPs, LID retrofits)

Connecticut Impervious Cover Model



(CT DEP)